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ORIGINAL ARTICLE

The cost–utility of lumbar disc herniation surgery

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Abstract The cost and utility of surgery for a herniated lumbar disc has not been determined simultaneously in a single cohort. The aim of this study is to perform a cost–utility analysis of surgical and nonsurgical treatment of patients with lumbar disc herniation. Ninety-two individuals in a cohort of 1,146 Swedish subjects underwent lumbar disc herniation surgery during a 2-year study. Each person operated on was individually matched with one treated conservatively. The effects and costs of the treatments were determined individually. By estimating quality of life before and after the treatment, the number of quality adjusted life years (QALY) gained with and without surgery was calculated. The medical costs were much higher for surgical treatment; however, the total costs, including disability costs, were lower among those treated surgically. Surgery meant fewer recurrences and less permanent disability benefits. The gain in QALY was ten times higher among those operated. Lower total costs and better utility resulted in a better cost utility for surgical treatment. Surgery for lumbar disc herniation was cost-effective. The total costs for surgery were lower due to lower recurrence rates and fewer disability benefits, and surgery improved quality of life much more than nonsurgical treatments.

Keywords Disc herniation · Surgery · Utility · QALY · Cost-effectiveness

Introduction

The herniated lumbar disc is the most common specific low back pain problem [13]. The treatment is conservative or surgical, the latter usually restricted for patients with severe symptoms [2, 22].

In order to investigate the effects and utilities of "everyday" treatments on common back problems, a longitudinal 2-year study was simultaneously undertaken in six different countries (Germany, The Netherlands, Denmark, Israel, the USA and Sweden) [10]. Almost no positive effects on pain, back function, work ability (sick-listing) or patient-reported utility could be revealed in any of the countries [10]. The only positive exception was after surgery for a herniated lumbar disc. Disc surgery improved pain in four out of the six participating countries, and back function and return to work rate (RTW) in only one country (Sweden) [4].

In the few studies where surgical treatment of a herniated lumbar disc has been compared with nonsurgical treatment, the conclusion usually has been that surgical treatment is more beneficial than nonsurgical within the first 5 postoperative years. After that time, the differences between the two have been found to level out [2, 9, 17, 22, 23].

By introducing utility as an outcome measure, the patients' own opinions of the health outcome consequences of the actual treatment are evaluated.

By further relating the costs for obtaining an improved utility, the cost-utility of the actual treatment can be determined as well. The utility of a treatment

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can be determined in different ways; but a health utility index, for example EQ-5D, is a complete system applicable for such analyses [3, 7, 12]. As far as we understand, the cost and utility of surgery for a herniated lumbar disc have never before simultaneously been determined [17].

The main objective of the present study was to perform a cost-utility analysis of disc surgery and nonsurgical treatments by using a health utility index and the costs for the individuals participating in the Swedish part of an international cohort study.

Materials and methods

Study population

A cohort of employed men and women between 18 and 59 years sick-listed at least 28 days due to either low back problems or neck problems was selected consecutively by the social insurance offices in five regions of Sweden between 1994 and 1995. Self- or unemployed, or those who had generalized arthritis, spinal fracture, tumour, infection or had had back surgery during the preceding year, as well as women suffering from back pain in connection with pregnancy, were excluded from the study. All cases involved carried an ICD-9 code (WHO 1977) 721, 722, 723 or 724.

Design

This study was a prospective registry and questionnaire cohort study with postal, self-administered questionnaires after 28 and 90 days, 1 and 2 years, combined with special diaries as well.

The cohort

The study included 1,822 individuals. The first questionnaire was answered by 1,393 of the subjects, the second by 1,146 persons, the third by 1,007 persons and the fourth by 887 persons. A comprehensive overall analysis of nonresponders revealed a higher proportion of younger people; males and persons sick-listed a shorter period [11]. Complete sick-listing information for the entire study period was obtained for all 1,822 persons (100%).

Pain drawing

In all four questionnaires, the participants were asked to mark pain distribution on a pain drawing and pain intensity on a visual analogue scale (VAS). The pain drawings were analyzed with the use of a specially developed, validated computerized system resulting in a likely diagnosis according to the pain distribution, e.g. lumbago, sciatica, lumbago–sciatica.

Disc surgery group

Ninety-two individuals in the study reported that they had undergone surgery during the 2-year study period due to a lumbar disc herniation. A herniated disc being the cause for surgery was later confirmed through the hospital files. Fifty-three percent were women, and the mean age for the group was 43 years (22–59). Among those in the surgical group, 80% reported sciatica (pain radiating below the knee) in one or both legs, preoperatively.

Matched controls

To allow comparisons between those operated for a herniated disc and those treated conservatively for the same type of symptoms, nonoperated persons in the cohort with as similar characteristics as possible were individually matched with those operated, (Table 1). The matching procedure controlled for gender, age, diagnoses, pain distribution, pain intensity and the presence of sciatica. Great effort was especially made to find individuals with similar pain intensity and pain distribution since change in pain severity was the single most significant result after surgery in the international comparison [10].

The questionnaire study

The four questionnaires included questions assumed to reflect three main domains: medical or health, socio demographic and occupational characteristics. As a complement to the questionnaires, every person was asked to note in a special diary all contacts, referrals, appointments, admissions type of examinations and treatments for the ongoing spinal problems. The questionnaires incorporated also a number of validated instruments concerning quality of life, pain, back function, pain drawing, etc.

EuroQol (EQ-5D)

EuroQol-5D provides a measure of overall health-related quality of life based on five dimensions (physical activity, activity of daily living/ADL, work ability, pain and depression/anxiousness), with three

Table 1 Patient characteristic at baseline (28 days) evaluation

Characteristic	Treatment group		
	Surgical (n = 92)	Nonsurgical (n = 92)	P value
Age, mean years (range)	43 (22–59)	43 (22–59)	0.993[g]
Gender, female (%)	53.3	53.8	0.937[h]
Education completed, upper secondary (%)	32.9	31.6	0.159[h]
Primary job, public sector (%)	48.2	36.8	0.533[h]
Psychological job demand[a], mean	2.94	2.99	0.339[g]
Job control[b], mean	3.18	3.11	0.364[g]
Job strain[c], mean	0.95	0.98	0.332[g]
When did the health complaints start? (%)			
< 1 week before sick-listing	17.8	21.6	
1 week–1 year before sick-listing	43.3	34.1	0.444[h]
> 1 year before sick-listing	38.9	44.3	
Sciatica yes (%)	80.0	79.3	0.911[h]
EQ-5D[d] mean	0.403	0.474	
Median	0.362	0.689	0.090[i]
von Korff[e], mean	7.1	7.0	0.490[h]
Hannover ADL[f], mean	47	58	0.000[h]

[a]Psychological job demand, scaling between 1 and 4, higher scores indicates higher psychological demand

[b]Job control, scaling between 1 and 4, higher scores indicate higher control

[c]Job strain, scaling between 0.25 and 4, higher scores indicate higher job strain

[d]Quality of life EuroQol (EQ-5D), scaling between 0 and 1, higher scores indicate better quality of life

[e]Pain intensity von Korff, scaling between 0 and 10, lower scores indicate less pain

[f]Back function Hannover ADL, scaling between 0 and 100, higher scores indicate better function

[g]Independent samples tests

[h]Chi-square tests, Fishers' exact test

[i]Mann–Whitney test

levels of answers and a rating scale. Utility values between 0 (death) and 1 (full health), for the different possible combinations of answers have been obtained using the time trade-off method. The EQ-5D social tariff, estimated from a representative sample of the UK population, was used to convert the individual's responses to the EQ-5D questionnaire at baseline and 2 years [3, 5–7].

Hannover AD

This is a back-specific battery of questions which measures functional restrictions caused by back problems and includes 12 separate questions [15].

von Korff pain scale

With seven questions, this scale measures pain experienced during the last 6 months [16].

Cost of illness

Direct costs

Direct costs consist primarily of medical costs, such as those for diagnostics, treatment, hospital admissions and rehabilitation, and also include certain expenditures due to the illness or disease, such as travel and time expenses for an appointment.

The latter types of costs were not accounted for in this study. Therefore, only the direct medical costs for the then-current back pain were estimated [11, 20].

Indirect costs

Indirect costs are usually defined as the costs due to production losses and related societal costs to society due to morbidity and mortality. In the case of back pain, production losses can be the result of work absenteeism and disablement. Since the mortality risk of a disc herniation is negligible per se, the costs for morbidity only are included in this study [14], [20].

The human capital approach was used in the study. It is based on the assumption that earnings reflect productivity; indirect costs are often restricted to the earnings lost [7].

The costs of work absenteeism due to back pain were estimated by multiplying the total number of days sick-listed with the cost per time unit. The latter equals the monthly salary plus the employer's payroll taxes converted into a daily cost. For those individuals who were granted permanent disability benefits during the study period due to their then-current problems, the production loss was calculated up until the first day of senior citizen pension (at 65 years). A 5% discount rate and an assumed annual increase in productivity of 1.5% were used to convert future years production loss to present values [11]

Quality of life

In this study, health-related quality of life (HRQoL) was the important outcome. The focus was on how well the treatments (surgery or nonsurgery) improved the patient's functional restrictions (Hannover ADL), pain (von Korff), mobility, self-care, daily activities, and pain and anxiety (EQ-5D), i.e. the subject's perception of his/her own HRQol [6, 7, 18] (Table 1).

Changes in the quality of life were measured with health-related quality-of-life instruments (EQ-5D). The quality-of-life can be combined with changes in quantity of life, as measures in life-years, (e.g. lives saved). In such a way, the number of quality-adjusted life years (QALY) gained by a particular intervention can be determined. If, for example, an individual reports a certain health condition valued as worse than full health, the reported condition can be quality adjusted with a quality of life value (e.g. the EQ-5D value) ranging between 0 (death) and 1 (full health). Every life year is then multiplied with the individuals reported EQ-5D value. If for example, the individual's quality of life is valued at 0.7 and the remaining life is 10 years, then the number of QALYs is 7.

Cost–utility analysis

Cost–utility analysis (CUA) refers to a particular form of cost-effectiveness analysis where the outcome is measured in terms of QALY gained. This can be compared with the total cost of the program to determine the cost per QALY gained [18, 19]. The CUA allows broad comparisons across differing and not necessarily comparable programs.

Statistics

Each person in the surgery group was individually paired with a person not operated on. The purpose of the matching was to control for confounding effects that might influence comparisons between the groups. For each subject of the surgery group, a subject from the nonsurgery group having the same age, gender, pain distribution, pain intensity and diagnosis was selected. If a person of exactly the same age could not be found, a person closest in age was chosen.

For comparison between the surgery and nonsurgery groups at a single time, independent two samples T test was used when the means had a normal distribution, otherwise the Mann–Whitney test for nonparametric comparisons was applied. For within-subject comparisons of measurements obtained at 28 days and 2 years, the paired T test for parametric comparisons and Wilcoxon signed rank test for nonparametrics were used. The median was consequently used for the EQ-5D values since they were not normally distributed.

Results

Cost of illness

Direct costs

The direct costs for every appointment, admission, examination and treatment during the 2-year study, and the mean total costs for the surgical group and the nonsurgical group are presented in Table 2. The mean direct cost for the group treated surgically was five times greater than for the group conservatively treated, $10,311 and $2,068, respectively.

The single greatest cost difference between the two groups was noted for the surgical procedure itself, including the subsequent hospital admission and related costs.

Indirect costs

A relatively high proportion of those in the nonsurgical group returned to work already within the first 2 months. However, the RTW rate during the same period among those in the surgical group was lower, thus resulting in a longer and more expensive initial sick-listing period. This was mainly due to the fact that

Table 2 Direct costs for all the different interventions ($)

Intervention	Treatment group		
	Cost per unit ($)	Surgical indirect costs ($)	Nonsurgical indirect costs ($)
General practitioner	119	31,908	37,958
Company physician	119	11,743	10,676
Private practitioner	119	4,863	5,219
Orthopedic surgeon	195	67,538	20,300
Neurologist	195	3,318	3,709
Psychiatrist	195	586	5,270
Rehabilitation specialist	119	5,270	9,565
Other physician	119	15,030	8,784
Disc surgery	4,685	657,658	0
Physiotherapist	48	63,375	33,441
Chiropractor	48	3,523	3,063
X-ray[a]		12,613	8,378
Spine imaging, CT or MR[b]	526	27,327	12,087
Medication[c]	1	43,892	31,784
Total direct costs		948,644	190,234
Mean direct costs		10,311	2,068

[a]The cost for a plain X-ray examination was included in the cost for outpatient visit to a physician and in that way included in the direct costs

[b]MRI or CT was not differentiated in the questionnaires

[c]The cost for drugs was calculated as an average daily cost for each individual

surgery was performed after a mean of 132 days; once surgery was performed it resulted in a relatively prompt RTW and a subsequent cessation of the sick-listing (Table 3). Although surgery had a distinct positive effect on the RTW, the relatively long sick-listing period while waiting for surgery resulted in higher initial indirect costs as compared to the nonsurgical group (Table 4).

The recurrence rate of sick-listing due to back problems after the end of the initial sick-listing period was much lower in the surgical than in the nonsurgical group during the 2-year follow-up (Table 3). In spite of the low recurrence rate among the operated, the mean cost for sick-listing, both for the initial sick-listing and the recurrences were still higher for the surgical group than the nonsurgical group (Table 4).

Table 3 Outcomes of surgical and nonsurgical treatments

Outcome variable at 2 years	Treatment group		
	Surgical (n = 92)	Nonsurgical (n = 92)	P value
EQ-5D[a], mean	0.628	0.610	
EQ-5D[a], median	0.725	0.725	0.728[h]
von Korff[b], mean	4.5	5.9	0.001[f]
Hannover ADL[c], mean	65	64	0.731[f]
Work status RTW at 1 year (%)	67.4	77.2	0.138[g]
Work status RTW at 2 years (%)	85.9	81.5	0.425[g]
Number of days sick-listed before the start of the study[d], mean	100	162	0.149[f]
Number of days sick-listed during the study, mean	233	173	0.001[f]
Number of days sick-listed after the study[e], mean	208	224	0.822[f]
Recurrences (%)			0.285[g]
0	81.5	73.9	
1	17.4	22.8	
2	1.1	0	
3	0	1.1	
> 4	0	2.2	

[a]Quality of life EuroQol (EQ-5D), scaling between 0 and 1, higher scores indicate better quality of life

[b]Pain intensity von Korff, scaling between 0 and 10, lower scores indicate less pain

[c]Back function Hannover ADL, scaling between 0 and 100, higher scores indicate better function

[d]Number of days sick-listed with the actual diagnoses 1 year before the start of the study

[e]Number of days sick-listed with the actual diagnoses 1 year after the cessation of the study

[f]Independent samples tests T test

[g]Chi-square tests, Fisherś exact test

[h]Mann-Whitney test

No permanent disability benefits were provided to the subjects operated for a herniated disc during the 2-year follow-up. In the nonsurgical group, eight subjects received such benefits during the same period solely due to a ‘‘disc diagnosis’’ (Table 4).

When taking into account the costs for initial sick-listing, sick-listing during recurrences and for permanent disability, including future projected production losses (up until the time of compulsory senior citizen pension, usually 65 years), the indirect costs were lower in the surgical group $32,807 than in the nonsurgical group $42,570 (Table 4).

Total costs

The mean total costs, including both direct and indirect costs, for those operated for a disc herniation during the 2-year study and for those treated conservatively, mounted to $43,118 and $44,638, respectively. The direct costs accounted for 24% of the total costs for the surgical group and 5% for the nonsurgical group.

Quality of life

After 2 years, both back function and pain had improved (P < 0.000) for those treated surgically (Table 5). For the subjects in the nonsurgical group, pain had improved significantly; however, back function had not during the 2-year period (Table 5). Notably the initial back function was more severely deteriorated among those in the surgical group.

Utility

When quality of life was measured using the health-related QoL instrument EQ-5D, the initial preoperative median value (after 28 days) was 0.362 (mean

Table 4 Different types of indirect costs, mean indirect costs, mean direct costs and mean total costs, $

Type of costs ($)	Treatment group			
	n	Surgical	n	Nonsurgical
Primary sick-listing episode	92	2,747,611	92	1,915,773
Recurrences of sick-listing episodes	17	270,647	24	492,753
Permanent disability benefits	0	0	8	1,507,900
Total indirect costs	92	3,018,258	92	3,916,426
Mean indirect costs		32,807		42,570
Mean direct costs		10,311		2,068
Mean total costs		43,118		44,638

Table 5 Change in symptoms and functional status from baseline (28 days) to 2-year follow-up

Variable	Treatment group							
	Surgical (n = 92)				Nonsurgical (n = 92)			
	28 days	2 years	Change	P value	28 days	2 years	Change	P value
EuroQol								
Mean	0.403	0.628	0.225	0.000[a]	0.474	0.610	0.136	0.001[a]
Median	0.362	0.725	0.363	0.000[b]	0.689	0.725	0.036	0.005[b]
Hannover ADL								
Mean	47	65	18	0.000[a]	58	64	6	0.171[a]
Median	46	67	21	0.000[b]	58	58	0	0.276[b]
von Korff pain								
Mean	7.1	4.5	2.6	0.000[a]	7.0	5.9	1.1	0.000[a]
Median	7.3	4.7	2.6	0.000[b]	7.0	5.8	1.2	0.000[b]

[a]Paired samples test

[b]Wilcoxon signed ranks test

0.403). About 1.5 years postoperatively, the corresponding EQ-5D value had increased to 0.725 (mean 0.628) (P value 0.000) for the surgical group.

For those in the nonsurgical group, the initial EQ-5D median value was 0.689 (mean 0.474), whereas it was 0.725 (mean 0.610) (P value 0.005) at the 2-year follow-up. When the initial values of the two groups were compared, it was evident that those subsequently undergoing surgery had more restricted back function and a quite lower QoL than those treated without surgery. There was, however, no difference between the initial pain intensity experienced in the two groups (Table 5).

QALY

The gain in QALY 1.5 years after surgical intervention 0.363 (mean 0.225), whereas it was 0.036 (mean 0.136) for the nonsurgical group, both of which were statistically significant (Table 6).

Table 6 The differences in outcome between 28 days and 2 years in the surgical and nonsurgical treatment groups

Variable	Treatment group		
	Surgical	Nonsurgical	P value
EuroQol			
Mean	0.225	0.136	
Median	0.363	0.036	0.177[b]
Hannover ADL			
Mean	18	6	0.001[a]
von Korff pain			
Mean	2.6	1.1	0.000[a]

[a]Independent samples test

[b]Mann–Whitney test

Cost–utility analysis

The duration of the gain in QALY was regarded here as the duration of the study itself, that is 2 years (Table 7). The difference in utility between 28 days and 2 years was used as the gain in QALY. Since the surgical procedure was performed at different times during the first year, the gain in QALY was multiplied by 1 (year). The effect difference between surgery and nonsurgery, 0.327, indicates that the cost for the improvement in utility was $4,648 per QALY gained. In spite of the high direct costs for surgery, the values reported in Table 7 reveal that surgical treatment had a better cost-utility than nonsurgical treatment in the present comparison.

Discussion

Earlier studies have shown that surgical discectomy is a cost-effective procedure in selected patients [17]. This study confirms the cost-effectiveness of this procedure and provides results demonstrating that surgery for a disc hernia in subjects with severe symptoms is a valuable procedure from a utility, as well as a cost-utility standpoint. By combining not only quality of life outcome measures, but also costs as well, the present study was in favor of surgery in carefully selected

Table 7 Cost–utility analysis

	Treatment group		
	Surgical	Nonsurgical	Difference
Cost ($)	43,119	44,638	1,520
Effect (QALY) median	0.363	0.036	0.327
$/QALY			4,648

patients. Even if pain intensity and back function are important measures of back problems, pain and disability are related to each other, but they are not synonymous [21].

In spite of the high costs for surgery itself and the fact that quite many of those operated on were sick-listed while waiting for surgery, this common surgical procedure was more cost- effective than nonsurgical treatment. The tenfold improvement in quality of life was the largest contribute to the higher gain in QALY surgery. The lower total cost for surgical treatment was an additional contribute, and was due to the lower recurrence rate of sick-listing episodes and much lower rate of permanent disability, indicating the importance of including work disability as an outcome measure in a cost–utility study of this type.

In comparison, the cost-utility value of $4,648 for one QALY for disc surgery is regarded as a low cost [8, 17]. Studies have indicated a tolerable cost for the gain of one QALY to be approximately $78,078 [8]. It must be remembered that this relatively low cost for one QALY was achieved after a study period of only 2 years. According to Weber [23], the outcome after disc surgery is superior to that of nonoperative treatment at least for the first 5 postoperative years. The risk for recurrence of a disc hernia is small and seems to be even smaller after the first postoperative year [13, 14]. It is therefore quite likely that the gain in QALY found in the present study will last for a longer time period, possibly for life. If that assumption is correct, the cost–utility for disc surgery is even more favorable.

A methodological problem in the present study, as well as in other studies evaluating the effects of surgical discectomy, was to find or define an adequate control group that would reflect at least to some extent the natural course of the symptom-giving herniated disc [1]. A similar problem existed even with Weber's classical study (RCT) [22]. The patients with the most severe symptoms, for example, were excluded from randomization and instead operated on quite early. Some patients in Weber's conservative group with deteriorating problems were moved (crossed over) to the surgical group, while others in the surgical group who were improving while waiting for surgery were later not operated [22]. From a utility standpoint it must also be highlighted that the pretreatment statements in Weber's study were not the patient's self-report of her/his health, but were solely the expert's/professional's statements [22]. The pretreatment statements from both the patient as well as the professional would be ideal.

In the more recent comprehensive, so-called Maine study, the primary selection of patients for surgery versus nonsurgery favored those with more pronounced symptoms for surgery [2]. From this and other studies, it is obvious that patients operated on usually have more severe symptoms. The natural course of the herniated lumbar disc disease is still incompletely known. However, it is known that the prognosis for a relatively fast alleviation of symptoms, in a substantial fraction of the patients with acute symptoms, is quite good [14]. A precondition for an optimal outcome is therefore to avoid surgery for those with a good early prognosis [10].

The matched controls in the present study were probably quite similar to those used as controls in the Maine study [2]. It is believed, that these groups of patients largely reflect the rather typical patient not operated, i.e. symptoms strongly suggesting a herniated disc yet not severe enough to prompt surgery.

The cases and controls in the present study were almost identical in gender, age, diagnoses, sciatica, distribution of pain and pain intensity. Although the pain intensity was the same, the controls initially had less deteriorated back function and a better QoL. In other words, they were not as affected as those subsequently undergoing surgery. Severely hampered back function and low QoL (EQ-5D) marked the greatest difference between those operated on with success and those not operated on. According to the findings in this study, it is not unlikely that several of the patients belonging to the control group with a low initial EQ-5D value and severely affected back function would have benefited from surgery. The results from the present study further suggest that the opposite might have been true as well, i.e. surgery should have been avoided for some operated patients with a relatively high EQ-5D value or "good" back function.

It can be recommended that once the initial conservative expectancy period has elapsed without any or just slight improvement, unnecessary waiting for surgery should be avoided. Unnecessary waiting will only prolong the suffering of the patient and contribute to extra indirect costs.

The results of this study showed that waiting for surgery was too long in many cases (average time of surgery was 132 days after the start of sick-listing).

The propensity for surgery, in the acute as well as in the subacute phase, varies between countries, and between different regions and different surgeons within the same country [2, 10, 13]. Acute surgery (within the first couple of weeks) is rarely considered and only when the pain is intolerable or when the pain is combined with serious neurological impairment. However, some clinicians are much more aggressive and use wider indications for early surgery, thus explaining some of the considerable variation in the rates of disc surgery across different countries [10]. Recently it was shown that the variation in prevalence of disc surgery in Sweden was quite limited, indicating one explanation for the seemingly better results in this country [13, 14].

In the earlier cited prospective multinational back study, the frequency of disc surgery within the starting 3 months was lower in Sweden than in any of the other participating national cohorts [11]. The rate of ''early'' surgery (< 3 months) was for example three times higher in the Netherlands and five times higher in the US cohorts [10]. Since the outcomes of disc surgery in the Swedish cohort seemed to be better than in the other countries, it is reasonable to assume that the low early surgical rate in Sweden demonstrated the appropriateness of a reluctant approach to very early surgery. A cost–utility analysis of this international comparison would most probably have shown that the appropriateness was reflected, not only by better QoL after surgery, but also by lower direct and indirect costs as well.

Even though discectomy produced a gain in utility, as shown in the present study there remains concerns that the gain is only temporary and that the results are the same after some years, irrespective of treatment [23]. This is perhaps the main reason why some clinicians assert that the benefits of surgery are frequently not worth the costs. Is the benefit from discectomy worth the risks and costs for patients with a self-limited problem? As done in this study the best answer may be to estimate the cost–utility for a patient with a disc herniation and accept the health-related quality of life as an important outcome. This study found that surgery for a herniated lumbar disc improves utility for those operated, and does so at a relatively low cost. The cost–utility can perhaps be further improved by optimizing, for example, the time when to undertake surgery and the selection criteria for those patients most appropriate for surgery.

Conclusions

The total cost for the surgical treatment of lumbar disc herniation during a 2-year period was lower than for nonsurgical treatment. The direct cost for surgery was much higher than for nonsurgical treatment, while the indirect cost was lower. The lower indirect cost for surgery was the effect of lower rates of recurrences of sick-listing episodes and permanent disability benefits. Surgery improved pain, back function and health-related quality of life and did so to a greater extent than nonsurgical treatments. The effects on quality of life in combination with the lower costs for surgery resulted in a better cost utility than for nonsurgery. The low cost for one QALY meant that disc surgery was quite cost-effective.

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